

# 2005 HAMILTON COUNTY BUILDING FOR ONE-, TWO- AND THREE-FAMILY DWELLINGS CODE OVERVIEW

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The purpose of this report is to convey some of the more substantial differences among the *1999 Ohio Residential Code* (the base code used for the *2001 HCBC*) and the *2004 Residential Code of Ohio* (the base code used for the *2005 HCBC*). Not all of the differences are listed. Only changes that (may) affect plan reviews and/or field inspections are listed. Additionally, Chapter 1 is not mentioned in this report.

## **Article A:**

**A4.G Prefabricated Assemblies and Structures.** Prefabricated assemblies and structures shall meet the requirements of this Code. When, in the opinion of the Building Official, full compliance with the structural provisions of this code are not practical, documentation of structural integrity shall be furnished in order for the Building Official to determine if the proposed use meets the spirit and intent of the code. A certificate of approval or listing by an approved agency shall be furnished with every prefabricated assembly intended for structural or service equipment purposes, except where all elements of the assembly are accessible for inspection at the site. Placement of prefabricated assemblies at the building site shall be inspected by the Building Official to determine compliance with this code, and a final inspection is required.

**A5** ...Also not requiring building permits are residential window and porch awnings (lightweight metal or canvas), fences (other requirements for fences, see B3F of this code), and one-, two- and three-family accessory structures up to and including 200 total square feet, provided they are held a minimum of six (6) feet away from any other structure, and a minimum of three (3) feet to any property

line. The Hamilton County Zoning Resolution and all local zoning requirements must still be met.

## **A29 TEMPORARY STRUCTURES AND USES**

- A. Temporary structures and uses shall comply with the applicable provisions of this code as required for permanent structures and uses as necessary to ensure the health, safety and general welfare of the public. Residential temporary structures and uses shall also comply with the requirements of Section A4.G. Approval for temporary construction shall be limited to the time of service, but such temporary construction shall not be allowed for more than 12 months. When, in the opinion of the Building Official, a longer time of service is warranted, residential temporary structures or uses may be permitted for up to 18 months.
- B. Termination of approval. The building official may terminate an approval for a temporary structure, order the discontinuance of a temporary use, and if necessary, order the demolition of any such construction.

## **Chapter 2: BUILDING DEFINITIONS**

**BASEMENT WALL:** The opaque portion of a wall that encloses one side of a basement and has an average below grade wall area that is 50 percent or more of the total opaque and non-opaque area of that enclosing side.

**BASIC WIND SPEED:** Three-second gust speed at 33 feet (10058 mm) above the ground in Exposure C (see Section R301.2.1) as given in Figure R301.2 (4).

**BATHROOM GROUP:** A group of fixtures, including or excluding a bidet, consisting of a water closet, lavatory, and bathtub or shower. Such fixtures are located together on the same floor level.

**BRACED WALL LINE:** A series of braced wall panels in a single story constructed in accordance with Section R602.10 for wood framing or Section R603.7 or R301.1.1 for cold-formed steel framing to resist racking from seismic and wind forces.

**BRACED WALL PANEL:** A section of a braced wall line constructed in accordance with Section R602.10 for wood framing or Section R603.7 or R301.1.1 for cold-formed steel framing, which extend the full height of the wall.

**BUILDING THERMAL ENVELOPE:** The basement walls, exterior walls, floor, roof and any other building element that enclose conditioned spaces.

**CONDITIONED AREA:** That area within a building provided with heating and/or cooling systems or appliances capable of maintaining, through design or heat loss/gain, 68°F (20°C) during the heating season and/or 80°F (27°C) during the cooling season, or has a fixed opening directly adjacent to a conditioned area.

**CONDITIONED SPACE:** For energy purposes, space within a building that is provided with heating and/or cooling equipment or systems capable of maintaining, through design or heat loss/gain, 50°F (10°C) during the heating season and 85°F (29°C) during the cooling season, or communicates directly with a conditioned space. For mechanical purposes, an area, room or space being heated or cooled by any equipment or appliance.

**CONTROLLED LOW-STRENGTH MATERIAL:** A self-compacted, cementitious material used primarily as a backfill in place of compacted fill.

**DEAD LOADS:** The weight of all materials of construction incorporated into the building, including but not limited to walls, floors, roofs, ceilings, stairways, built-in partitions, finishes, cladding, and other similarly incorporated architectural and structural items, any fixed service equipment.

**EXTERIOR WALL:** An above-grade wall enclosing conditioned space. Includes between floor spandrels, peripheral edges of floors, roof and basement knee walls, dormer walls, gable end walls, walls enclosing a mansard roof, and basement walls with an average below grade wall area that is less than 50 percent of the total opaque and non-opaque area of that enclosing side.

**FIREBLOCKING:** Building materials installed to resist the

free passage of flame to other areas of the building through concealed spaces.

**FIRE SEPARATION DISTANCE:** The distance measured from the building face to the closest interior lot line, to the centerline of a street, alley or public way, or to an imaginary line between two buildings on the property. The distance shall be measured at right angles from the lot line.

**GRADE FLOOR OPENING:** A window or other opening located such that the sill height of the opening is not more than 44 inches (1118mm) above or below the finished ground level adjacent to the opening.

**GRADE PLANE:** A reference plane representing the average of the finished ground level adjoining the building at all exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 ft. (1829mm) from the building between the structure and a point 6 ft. (1829mm) from the building.

**HABITABLE SPACE:** A space in a building used for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

**LIVING SPACE:** Space within a dwelling unit utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes.

**MEAN ROOF HEIGHT:** The average of the roof eave height and the height to the highest point on the roof surface, except that eave height shall be used for roof angle of not less than or equal to  $10^{\circ}$ F (0.18 rad).

**OCCUPIED:** With regard to buildings, structures, or portions thereof, the presence of personal possessions, persons or objects, or an area that is designed or intended for utilization.

**SHEAR WALL:** A general term for walls that are designed and

constructed to resist racking from seismic and wind by use of masonry, concrete, cold-formed steel or wood framing in accordance with Chapter 6 of this code and the associated limitations in Section R301.2 of this code.

**STRUCTURAL INSULATED PANELS (SIPS):** Factory fabricated panels of solid core insulation with structural skins of oriented strand board (OSB) or plywood.

**SUNROOM ADDITION:** A one-story structure added to an existing dwelling with a glazing area in excess of 40 percent of the gross area of the structure's exterior walls and roof.

**THERMAL ISOLATION:** A separation of conditioned spaces, between a sunroom addition and a dwelling unit, consisting of existing or new wall(s), doors, and/or windows.

### Chapter 3: BUILDING PLANNING

**Section R301.2 Climatic and geographic design criteria.** The climatic and geographic design criteria have changed. Wind loads are handled by wind speed.

TABLE R301.2 (1)  
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD (PSF)	WIND SPEED <sup>a</sup> (mph)	SEISMIC DESIGN CATEGORY <sup>g</sup>	SUBJECT TO DAMAGE FROM				WINTER DESIGN TEMP <sup>f</sup>	ICE SHIELD UNDER- LAYMENT REQUIRED <sup>i</sup>	FLOOD HAZARDS <sup>h</sup>	AIR FREEZING INDEX <sup>j</sup>	MEAN ANNUAL TEMP <sup>k</sup>
			WEATHERING <sup>a</sup>	FROST LINE DEPTH <sup>b</sup> (inches )	TERMITE <sup>c</sup>	DECAY <sup>d</sup>					
20	90	B	Severe	30	Moderate to heavy	Slight to moderate	7°F	No	1982	1000	50°F

**Section R301.2.2 Seismic provisions.** This section contains (very involved) seismic provisions. Of course, applicability depends upon where the jurisdiction is located. Hamilton County appears to be in Category B, which means that Hamilton County is not subject to any of the requirements of this section.

**Section R301.2.3 Snow loads.** The design of floors, walls and roofs, as specified in Chapters 5, 6 and 8, respectively, are for snow loads of 70 PSF, or less. Snow

loads exceeding 70 PSF shall be designed in accordance with accepted engineering practice.

**Section R301.2.4 Floodplain construction.** This section specifies design requirements for residential buildings and structures located in the floodplain and floodway. Identification of these structures will remain the responsibility of the Hamilton County Floodplain Administrator (Department of Public Works). Projects approved by the Hamilton County Floodplain Administrator in the floodway, shall be designed in accordance with the *Ohio Building Code*.

**Section R301.2.5 Freezing and thawing exposures.** The concrete section of the code looks substantially different; however, the technical requirements have only changed slightly. All of the concrete requirements of *CABO* were listed in one table (Table 402.2). The concrete provisions of the 2004 *RCO* are much more detailed and are scattered amongst numerous tables. Although the requirements for concrete are more detailed, the two main differences are as follows...

- The compressive strength of concrete used for driveways, curbs, walks, patios, carport slabs, steps, garage floors and other flatwork exposed to the weather, has increased from 3500 psi to 4500 psi. The requirements for air entrainment have not changed.

- (New) Table R301.2 (6) controls the maximum percent of cementitious material (filler), by weight, of all concrete exposed to deicing chemicals. Pozzolans (fly ash, slag, etc.) react with free lime (a by-product of the hydration process) to increase the density of the concrete mix. Also, pozzolans limit the temperature increase of the mix during the hydration process. Lowering the temperature of hydration, in turn, increases concrete's ultimate strength.

**Section R301.5 Live loads.** The code now has a structural design provision for guardrail, "in-fill" areas. Footnote f of Table R301.5 requires a design load of 50 pounds applied over 1 square foot of area. The allowable live load deflection (by Section R301.7) is  $H/240$ .

**Section R301.7 Deflection.** This section expanded to include separate provisions for exterior walls with brittle and non-

brittle type finishes, as well as aluminum structures. Exterior walls of plaster and/or stucco finishes have to adhere to a live load deflection limit of  $H/360$ . Exterior walls with brittle finishes (brick veneer) have a live load deflection limit of  $L/240$ , however, with flexible finishes (siding) they have a limit of  $L/120$ . Aluminum structural members and sandwich panels that do not support the edge of glazing are afforded an  $L/60$  live load deflection limit. If the same support glazing, the maximum allowable live load deflection is  $L/120$ .

**Section R303.2 Adjoining rooms.** The building code now allows natural light and/or natural ventilation (required for habitable spaces) to be taken from thermally isolated sunrooms (or patio covers) provided that there is an openable area between the adjoining room and the sunroom addition or patio cover of not less than one-tenth of the floor area of the interior room but not less than 20 square feet. The minimum openable area to the outdoors shall be based upon the total floor area being ventilated.

**Section R305.1 Minimum height.** Required bathroom ceiling heights have been reduced from 7 feet to 6'-8". The 6'-8" measurement is required in front of and above plumbing fixtures and for a 30"x30" area in front of a showerhead. Also, habitable spaces created in existing basements shall have 6'-8" ceilings with projections not below 6'-4".

**Section R309.2 Separation required.** The code still requires  $\frac{1}{2}$ " gypsum board (on the garage side) separating the residence and its attic area from the garage. However, when there is habitable space above the garage,  $\frac{5}{8}$ ", Type X gypsum is required. Also, if a rated floor-ceiling assembly is used, all supporting walls shall be covered with  $\frac{1}{2}$ " gypsum board whether they are common walls or not.

**Section R311.2.1 Attachment.** This is a new requirement stating that exit balconies, stairs, ramps, decks and landings shall be attached to the primary structure to resist both vertical and horizontal forces. Such attachment shall not be accomplished by use of nails or toenails subject to withdrawal. This requirement is repeated in Chapter 5.

**Section R311.4.1 Exit door required.** All habitable floors shall have access to the required exit door by a complying

stair (or ramp) or shall be provided with a 3068 side hinged exit door off of that level with the required landing and stair.

**Section R311.5.4 Landings for stairways.** Maximum total rise between floor levels or landings is 12 feet.

**Section R311.5.6 Handrails.** Handrails are required for 4 or more risers, instead of 3 or more.

**Section R311.5.6.2 Continuity.** The code now approves handrails that are not continuous. The handrail ends shall be no more than 4 inches apart and shall splice over one tread. If transitioning from a wall-mounted handrail to a guardrail, the wall-mounted handrail end shall be returned to the wall.

**Section R312.2 Guard opening limitations.** There are two major changes made to required guards. First, the "ladder effect" provision has been removed, thus allowing horizontal rungs. Secondly, guards located **along stairs treads** shall not allow a 4-3/8 inch diameter object to pass, instead of 4 inch.

**Section R313.1.1 Alterations, repairs and additions.** The code identifies that the addition of decks, screened-in-porches and similar structures do not trigger the requirement of adding smoke detectors.

**Section R323 Flood Resistant Construction.** For users of the CABO Code and/or IOTFDC this section is new. It is, however, in the 2000 IRC as Section R327. This comprehensive set of floodplain regulations applies to all buildings and structures constructed in flood hazard areas, unless approved by the Flood Plain Administrator.

## **Chapter 4: FOUNDATIONS**

**Section R401.4.1 Geotechnical evaluation.** Table R401.4.1 has changed. The assumed soil bearing values dropped from 3000 psf in the 1999 ORC down to 2000 psf in the 2004 RCO. Required footing widths may increase.

Examples:

1. The minimum width of spread footing that will be required below a two story (above grade) wood framed

- house with brick veneer will be 16 inches. Since most builders already indicate on their plans a 16-20 inch wide footing, the change is of no consequence.
2. Let's consider a deck and all of its deck dead loads, 2 ft. maximum joist cantilevers and 1 ft. maximum beam cantilevers, a footing supporting 60 square feet of deck area will now require a 23 inch diameter footing, whereas, a 14 inch diameter footing used to be acceptable.

**Section R403.1.4.1 Frost protection.** There are two exceptions from requiring frost protection of footings...

1. freestanding accessory structures of 400 sf or less with eave heights not exceeding 10 ft., and
2. decks not supported by the dwelling.

**Section R403.1.7 Footings on or adjacent to slopes.** Slope stability issues have not been addressed in any previous OBOA code. It was, however, a part of the *1989 Hamilton County Building Code* and is no stranger to the IRC series of codes. The challenging part of regulating this section of the code will be in obtaining enough information about a building's surrounding topography to make good code decisions. Notoriously, site plans, submitted for building permits, are void of, "real-time" topography data about the lot in question, not to mention all adjoining lots. Currently, Public Works deals with all slope stability issues.

**Table R404.1.1 (1) Plain Concrete and Plain Masonry Foundation Walls**

The height of unbalanced fill permitted against some 8 ft. and 9 ft. foundation walls have (formally) increased.

The *1999 ORC* allowed...

- 8 in. thick x 8 ft. tall foundation walls are permitted to support up to 5 ft. of unbalanced fill.
- 10 in. thick x 8 ft. tall foundation walls are permitted to support up to 7 ft. of unbalanced fill.
- 8 in. thick x 9 ft. tall foundation walls are permitted to support up to 5 ft. of unbalanced fill.
- 10 in. thick x 9 ft. tall foundation walls are permitted to support up to 7 ft. of unbalanced fill.

The *2004 RCO* allows...

-8 in. thick x 8 ft. tall foundation walls are permitted to support up to 7 ft. of unbalanced fill.  
-10 in. thick x 8 ft. tall foundation walls are permitted to support up to 8 ft. of unbalanced fill.  
-8 in. thick x 9 ft. tall foundation walls are permitted to support up to 5 ft. of unbalanced fill.  
-10 in. thick x 9 ft. tall foundation walls are permitted to support up to 8 ft. of unbalanced fill.

## **Chapter 5: FLOORS**

**Section R502.2.1 Decks.** This section requires decks, when attached to an exterior wall, to be anchored to the primary structure without the use of toenails or nails subject to withdrawal. This means that anchorage to brick veneer is not permitted (and has not been for two code cycles now). ***Additionally, the connection must be fully visible at the time of inspection or the deck has to be redesigned as self-supporting.***

**Section R502.3 Allowable joist spans.** Joist span tables have been simplified, in terms of use. A joist's Modulus of Elasticity (E) is no longer used (or involved) in utilizing the span tables.

**Section R502.3.3 Floor cantilevers.** This section is new to the Ohio Residential Code series. The general requirement is that no cantilever shall exceed the depth of the joists used to frame the cantilever. Special provisions for cantilevers supporting lightweight framed bearing walls with roof loads only and cantilevers supporting balconies are provided in Table R502.3.3(1) and Table R502.3.3(2), respectively.

**Section R502.5 Allowable girder spans.** Table R502.5(1) specifies the number of jack studs required under the ends of girders and headers. Applicability of this table is limited by the footnotes.

## **Chapter 6: WALL CONSTRUCTION**

**Section R602.8 Fireblocking required.** Fireblocking is now required in concealed (furred) spaces at horizontal intervals not exceeding 10 ft.

**Section 602.10 Wall bracing.** This section has changed drastically and is fairly complicated. There will be more training on this section at a later date. For now, here are two bits of information...

**Section R602.10.7 Panel Joints.** The horizontal seams of all braced wall panels no longer require solid blocking.

**Section R602.10.8 Connections.** Braced wall panels, when paralleling the floor joists, shall be placed directly over a joist and be nailed per the fastening schedule. When perpendicular to the joists, solid (joist) blocking shall be installed between beneath the braced wall panel, its entire length.

## **Chapter 7: WALL COVERINGS**

**Section R703.7.4.2 Air Space.** Stone and masonry veneers shall be separated from the sheathing by an air space of a minimum of a nominal 1 inch (3/4 inch).

## **Chapter 8: ROOF-CEILING CONSTRUCTION**

**Section R802.3 Framing details.** Where the roof pitch is less than 3:12, structural members that support rafters and/or ceiling joists shall be design as load bearing beams to resist rafter thrust forces.

**Section R802.4 Allowable ceiling joist spans.** and **Section R802.5 Allowable rafter spans.** The span tables located in these sections have been simplified greatly. The tables no longer involve Fiber Stress figures ( $F_b$ ) and Modulus of Elasticity figures ( $E$ ). After choosing the proper table based on loadings and deflection limits, merely match the framing member size and spacing with the lumber species and grade and read the allowable span.

**Section R802.10.5 Truss to wall connection.** Trusses shall be connected to wall plates by the use of approved connectors having an uplift resistance of **not less than 175 lbs.** Truss design sheets specifying higher amounts of uplift resistance shall govern.

**Note:** The automatic 20 psf bottom chord live load that was triggered by the passage of a 24"w x 42"h object has been removed from the code.

## **Chapter 10: CHIMNEYS AND FIREPLACES**

**Section R1003.7.1 Damper.** Dampers are now required by the model code. They shall be not less than 8 inches above the top of the fireplace opening.

## **Chapter 11: ENERGY CONSERVATION**

Energy conservation is handled by Chapter 13 of the Ohio Building Code. In there is a prescriptive method of insulation that requires the following R-Values:

Exterior walls	R-18
Roofs	R-38
Basement walls	R-9 (entire wall)
Floors	R-21 (over unconditioned space)
Slab edges	R-6 (top of slab, down 24")
Glazing	$U_o=0.45$ max.

## **Chapter 16: DUCT SYSTEMS**

**Section M1601.1.1 Above-ground duct systems.** Item 7 stipulates that cold air returns that utilizing stud wall cavities shall not convey air from more than one floor level.